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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,319	07/09/2003	Heidi D. Zhang	133860-2 (MHM 14882US02)	1891
23446	7590	04/15/2008	EXAMINER	
MCANDREWS HELD & MALLOY, LTD			MEHTA, PARIKHA SOLANKI	
500 WEST MADISON STREET			ART UNIT	PAPER NUMBER
SUITE 3400			3737	
CHICAGO, IL 60661			MAIL DATE	DELIVERY MODE
			04/15/2008	PAPER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/616,319

Filing Date: July 09, 2003

Appellant(s): ZHANG ET AL.

Joseph M. Butscher
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 30 November 2007 appealing from the Office action mailed 2 October 2007.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,706,327	Adamkowski	1-1998
6,027,457	Shmulewitz	2-2000
5,553,111	Moore	9-1996
2003/0007598	Wang	1-2003
5,984,870	Giger	11-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Previous Grounds of Rejection

Claim Rejections - 35 USC § 112

Claims 2 and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

Claim Rejections - 35 USC § 103

Claims 1-17, 19-39, 41-44, 46-50, 52-62, 64 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shmulewitz (US Patent No. 5,479,927), hereinafter Shmulewitz ('927), previously cited by Applicant, in view of Adamkowski (US Patent No. 5,706,327), hereinafter Adamkowski ('327), previously made of record.

Claims 18, 40 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shmulewitz ('927) in view of Adamkowski ('327), further in view of Moore (US Patent No. 5,553,111), hereinafter Moore ('111), previously made of record.

Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Shmulewitz ('927) in view of Adamkowski ('327), further in view of Giger (5,984,870), hereinafter Giger ('870), previously made of record.

Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shmulewitz ('927) in view of Adamkowski ('327), further in view of Wang (US PG Pubs. No. 2003/0007598), hereinafter Wang ('598), previously made of record.

New Grounds of Rejection

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 3700

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-17, 19-39, 41-44, 46-50, 52-62, 64 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shmulewitz (US Patent No. 5,479,927), hereinafter Shmulewitz ('927), previously cited by Applicant, in view of Adamkowski (US Patent No. 5,706,327), hereinafter Adamkowski ('327), previously made of record.

Regarding claims 1, 3-17, 18-24, 26-39, 42-44, 46-50, 52-62 and 65, Shmulewitz ('927) teaches a system for ultrasound and x-ray mammography comprising a CPU (Fig. 8, col. 11 lines 34-42), first and second compression plates, a breast compression area defined between the compression plates (Fig. 1), and an ultrasound probe having a 2D phased array, wherein the array elements may be individually and sequentially activated (col. 9 lines 15-20, col. 12 lines 14-21). The phased array of Shmulewitz ('927) constitutes an active matrix array wherein the transducer elements are selectively activated as claimed in the instant application. The lower plate of Shmulewitz ('927) remains in a fixed orientation with respect to the second plate during imaging (col. 7 line 65 – col. 8 line 2). Shmulewitz ('927) teaches the compression plate to be radiolucent (col. 8 lines 40-45), and further shows that the plates are configured to adequately contact the breast without substantially flattening it (Fig. 2). The imaging assembly of Shmulewitz ('927) is secured to a portion of the x-ray mammography system (Fig. 1). The system of Shmulewitz ('927) is upright and configured to image the patient while she is seated or standing, both of which constitute standard mammography positions as claimed in the instant application (Fig. 1). Shmulewitz ('927) provides a plate comprised of sonolucent material (col. 8 lines 40-45), over which an ultrasonic probe may be translated (Fig. 7), and additionally teaches that the bottom stabilization plate has sound-absorbing qualities (col. 12 lines 8-10). Shmulewitz ('927) teaches means for displaying and registering ultrasound and x-ray images of the breast (col. 11 lines 20-33), wherein the system can display a single ultrasound frame or a three-dimensional representation of the breast. The frame and three-dimensional representation of Shmulewitz ('927) constitute an individual slice and a thick slice, respectively, as claimed in the instant application.

Schmulewitz ('927) fails to teach that the two compression plates are angled with respect to each other, and consequently fails to teach any features for the assembly related to the mechanism or adjustment of such an angled arrangement.

In the same field of endeavor, Adamkowski ('327) teaches a mammography system in which the upper compression plate is angled with respect to the lower compression plate (Fig. 2). Adamkowski ('327) angles the upper plate via a pivot and spring assembly (Figs. 3 & 4), which allows for arcuate relative motion between the two plates as claimed in the instant application. Adamkowski ('327) also includes in the assembly an upright member 14 supported by a base 12, and shows that the pivot assembly 34 is connected to an extension member 22, and the compression stage assembly is capable of vertical translation (Figs. 1-4, col. 3 lines 35-37). The extension member is also shown to be perpendicular to the upright member (Fig. 1). Since the pivot assembly of Adamkowski ('327) creates and changes the angle established by the relative position of each of the first and second plates, it can be said to be "operatively connected" to both plates as claimed.

Adamkowski ('327) teaches that the angled plate configuration promotes uniform compression of the breast (col. 1 lines 48-55). In view of such teachings, one of ordinary skill in the art at the time of invention would have found it obvious to modify the system of Shmulewitz ('927) to include the angled compression plate assembly of Adamkowski ('327), in order to improve the uniformity of compression across the patient's breast.

Regarding claims 2 and 25, Adamkowski ('327) teaches of a second pivot assembly comprising a spring attached to one of the compression plates (Figs. 3-5 elements 34a and 34b). As previously established for claim 1, since the spring changes the angle created by the two compression plates, it can also be said to be "operatively connected" to each of the plates as claimed.

Regarding claims 19, 41 and 64, neither Shmulewitz ('927) nor Adamkowski ('327) explicitly teach imaging in the cranio-caudal and mediolateral oblique planes. However, Applicant admits that it is known in the art to image in the CC and MLO planes during a standard mammography procedure (Specification, p.1 ¶ 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use the system of Shmulewitz ('927), previously modified by Adamkowski ('327), to image the breast of a patient in the CC and MLO planes, in view of Applicant's admission of the general state of the art.

Claims 18, 40 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shmulewitz ('927) in view of Adamkowski ('327), further in view of Moore (US Patent No. 5,553,111), hereinafter Moore ('111), previously made of record.

Shmulewitz ('927) and Adamkowski ('327) substantially teach all features of the present invention as previously applied to claims 1 and 52. Neither Shmulewitz ('927) nor Adamkowski ('327) provide a swivel member configured to rotate the plates through a plurality of imaging orientations. In the same field of endeavor, Moore ('111) teaches a plate twisting assembly for mammography (Figs. 2A & 2B), wherein the twisting of Moore ('111) is equivalent to the swivel mechanism claimed in the instant application. Moore ('111) teaches that twisting the plates induces a shearing or rolling motion of the breast tissue, which is effective to expose lesions in the breast that would otherwise be undetectable (col. 1 lines 43-52). It would have been obvious to one of ordinary skill in the art at the time of invention to further modify the system of Shmulewitz ('927), previously modified by Adamkowski ('327), to also include means for twisting the compression plate relative to the base plate so as to more comprehensively image the breast for lesions, in view of the teachings of Moore ('111).

Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Shmulewitz ('927) in view of Adamkowski ('327), further in view of Giger (5,984,870), hereinafter Giger ('870), previously made of record.

Shmulewitz ('327) and Adamkowski ('327) substantially teach all features of the present invention as previously discussed for claim 24. Both Shmulewitz ('327) and Adamkowski ('327) fail to teach a CPU capable of automatically analyzing the ultrasound image data for lesions, cysts, or microcalcifications. In the same field of endeavor, Giger ('870) provides a computer system for automatically classifying breast lesions for diagnosis (Fig. 1). Giger ('870) teaches that automatically classifying breast lesions provides for objective and reliable diagnosis of cancer, and improves the specificity of the cancer screening process (col. 2 lines 42-46). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Shmulewitz ('927), previously modified by Adamkowski ('327), to also include the automated lesion classification program of Giger ('870), in order to more objectively and reliably diagnose breast cancer in the patient.

Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shmulewitz ('927) in view of Adamkowski ('327), further in view of Wang (US PG Pubs. No. 2003/0007598), hereinafter Wang ('598), previously made of record.

Shmulewitz ('927) and Adamkowski ('327) substantially teach all features of the present invention as previously discussed for claim 24. Both Shmulewitz ('927) and Adamkowski ('327) fail to

provide means for displaying a CINE loop of individual ultrasound slices on the monitor. In the same field of endeavor, Wang ('598) teaches a system for ultrasound mammography, with which a radiologist may manually navigate individual ultrasound slices or view them automatically via a CINE loop (pp 0034). It would have been obvious to one of ordinary skill in the art at the time of invention to further modify the system of Shmulewitz ('927), previously modified by Adamkowski ('327), to also include the CINE loop display feature of Wang ('598) in order to automate and thereby simplify ultrasound image navigation for the radiologist, in view of the teachings of Wang ('598).

(10) Response to Argument

I. Claims 2 and 25, as rejected under 35 U.S.C. 112, First Paragraph

Claims 2 and 25 were rejected under 35 U.S.C. 112, first paragraph, for reciting an embodiment not sufficiently enabled by the supporting specification. Applicant contests this rejection by arguing that the unenabled embodiment cited by the Examiner is not currently claimed. However, this rejection is hereby withdrawn in view of the new grounds of rejection presented above, wherein the term "operatively connected" is given a broader interpretation than that relied upon in the previous Office Action.

II. Claims 1-17, 19-39, 41-44, 46-50, 52-62, 64 and 65, as rejected under 35 U.S.C. 103(a) in view of Shmulewitz ('927) and Adamkowski ('327)

A. At least one pivot assembly operatively connected to each of two compression plates as recited in claims 1, 24 and 52

1. Alleged Lack of a Connection to Both Plates

Applicant contends that neither Shmulewitz ('927) nor Adamkowski ('327) teach at least one pivot assembly that is operatively connected to each of a first and second compression plate. The definition of the word "connect" is "to place or establish in relationship", and the definition of the word "operatively" is "producing an appropriate effect; efficaciously" (Merriam Webster Online 12 Feb 2008). Since the pivot assembly of Adamkowski ('327) establishes a nonzero angular relationship between the first and second compression plate, it

can thus be said that the reference pivot is operatively connected to each of the two reference compression plates. Accordingly, Shmulewitz ('927) and Adamkowski ('327), in combination, do in fact teach all features and limitations of the presently claimed invention.

2. Allegations of hindsight reconstruction and arguments against obvious design choice

Applicant contends that Examiner has failed to sufficiently substantiate the rejection of the attachment of the pivot assembly of Adamkowski ('327) to both compression plates as being an obvious matter of design choice. These arguments are rendered moot by the new grounds of rejection presented above, namely the broadened interpretation of the presently recited phrase "operatively connected", wherein it is shown that the pivot of Adamkowski ('327) is in fact "operatively connected" to both plates as claimed. Accordingly, Shmulewitz ('927) and Adamkowski ('327), in combination, do in fact teach all features of the presently claimed invention.

B. A spring member that connects [one] compression plate to [another] compression plate

Applicant concedes that Adamkowski ('327) teaches a spring 42 between a compression surface 32 and a frame 30, but alleges that the reference spring 42 does not read upon presently claimed spring because "these springs are not used to connect the compression surface 32 to the breast supporting surface 20". As was similarly discussed above for the pivot assembly of Adamkowski ('327), since the reference spring 42 establishes a nonzero angular relationship between the compression surface ("first compression plate") and breast supporting surface ("second compression plate"), it can be said that the spring operatively connects the two surfaces/plates. Accordingly, Shmulewitz ('927) and Adamkowski ('327), in combination, do in fact teach all features of the presently claimed invention.

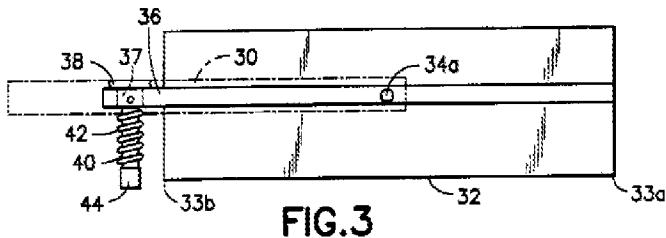


FIG. 3

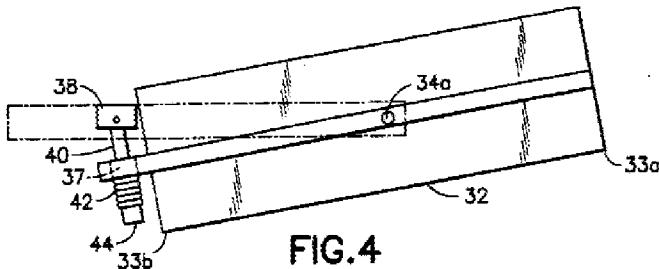
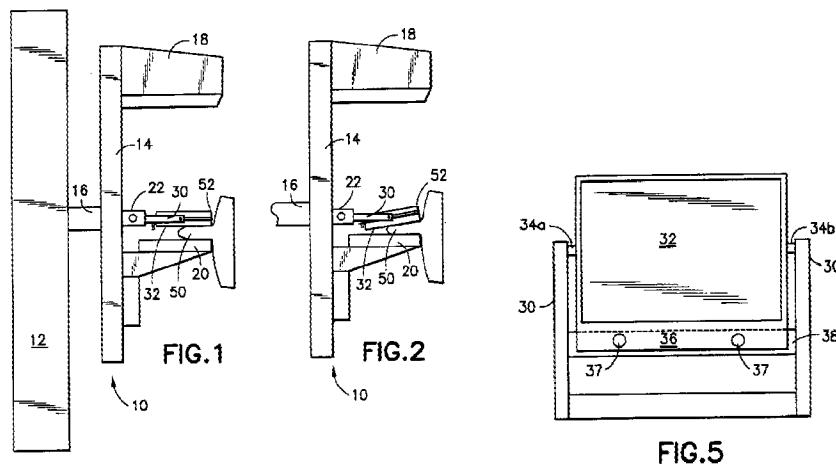


FIG. 4

Source: Adamkowski et al (US Patent No. 5,706,327)

C. Claims 6, 29 and 54

Applicant states that neither Shmulewitz ('927) nor Adamkowski ('327) teach or suggest a "first compression plate being operatively connected to a first pivot assembly, which is in turn positioned on a first portion of said upright member, said second compression late being operatively connected to a second pivot assembly, which is in turn positioned on a second portion of said upright member", nor do the references teach an "upper compression plate being operatively connected to a first pivot assembly, which is in turn positioned on a first portion of said upright member, said lower compression late being operatively connected to a second pivot assembly, which is in turn positioned on a second portion of said upright member". As discussed above, the pivot assemblies taught by Adamkowski ('327) are in fact operatively connected to both plates as claimed. Furthermore, the pivot assemblies (wherein the two assemblies are elements 30 + 34a and 30 + 34b, respectively, as shown in Fig. 5 of Adamkowski) are also both positioned on first and second portions of the upright member (elements 22 + 14 together, as shown in Figs. 1 & 2 of Adamkowski) as claimed, wherein the first and second portions can be interpreted to be the different points at which the bottom surface of members 30 contact element 22.



Source: Adamkowski et al (US Patent No. 5,706,327)

III. Claims 18, 40 and 63, as rejected under 35 U.S.C. 103(a) in view of Shmulewitz, Adamkowski ('327) and Moore

A. A swivel member that connects the pivot assembly and both compression plates to the upright member

Applicant concedes that Moore provides a mechanism for translating or twisting a breast compression plate ("first compression plate") and a breast supporting surface ("second compression plate"), but alleges that this mechanism cannot constitute the presently claimed swivel member because the reference mechanism purportedly does not connect the two compression plates. As was similarly discussed above for the pivot assembly and spring of Adamkowski ('327), since the swivel mechanism of Moore establishes a nonzero angular relationship between the planes created by the lateral surfaces of each of the compression plates, the swivel mechanism does in fact operatively connect both plates as claimed. Accordingly, Shmulewitz ('927), Adamkowski ('327), and Moore ('111) in combination, do in fact teach all features of the presently claimed invention.

IV. Claim 45, as rejected under 35 U.S.C. 103(a) in view of Shmulewitz, Adamkowski ('327) and Giger ('870)

Applicant makes no additional arguments to support the appeal of this rejection other than those arguments previously presented for claims 1-18, 19-40, 41-44, 46-50, 52-63, 64 and 65.

V. Claim 51, as rejected under 35 U.S.C. 103(a) in view of Shmulewitz, Adamkowski ('327) and Wang ('598)

Applicant makes no additional arguments to support the appeal of this rejection other than those arguments previously presented for claims 1-18, 19-40, 41-45, 46-50, 52-63, 64 and 65.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section (9) above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Art Unit: 3700

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

/Parikha S Mehta/

Examiner, Art Unit 3737

A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:

/Frederick R Schmidt/

Director, Technology Center

Conferees:

Brian Casler

/Brian L Casler/

Supervisory Patent Examiner, Art Unit 3737

Angela Sykes

/Angela D Sykes/

Supervisory Patent Examiner, Art Unit 3762